Illustration 3 g01108481

Turbocharger

(1) Air inlet

(2) Compressor housing

(3) Compressor wheel

(4) Bearing

(5) Oil Inlet port

(6) Bearing

(7) Turbine housing

(8) Turbine wheel

(9) Exhaust outlet

(10) Oil outlet port

(11) Exhaust inlet

The turbocharger is mounted to the exhaust manifold. All the exhaust gases flow from the exhaust manifold through the turbocharger. The exhaust gases then flow into turbine housing (7) through the exhaust inlet. These gases push the blades of the turbine wheel (8). The turbine wheel is connected by a shaft to the turbocharger compressor wheel (3). Therefore, the exhaust gases cause the two wheels to turn at very high speeds.

Clean air from the air cleaner is pulled through the air inlet (1) by the rotation of turbocharger compressor wheel (3). The action of the compressor wheel blades causes compression of the inlet air. Compressed air provides more power to the engine. Additional air is available to fill the combustion chamber after the inlet valve opens.

When the load on the engine increases, more fuel is injected into the cylinders. This creates more gases and hotter gases, which will cause the turbine to turn faster. Therefore, the turbocharger compressor wheel will turn faster.

As the compressor wheel turns faster, more air is forced into the engine. The increased air flow provides more power to the engine, because the engine can then burn additional fuel with greater efficiency.

The following conditions control the maximum rpm of the turbocharger:

- Fuel setting
- High idle speed setting
- Height above sea level

NOTICE

If the high idle rpm or the engine rating is higher than given in the Technical Marketing Information (TMI) for the height above sea level at which the engine is operated, there can be damage to engine or to

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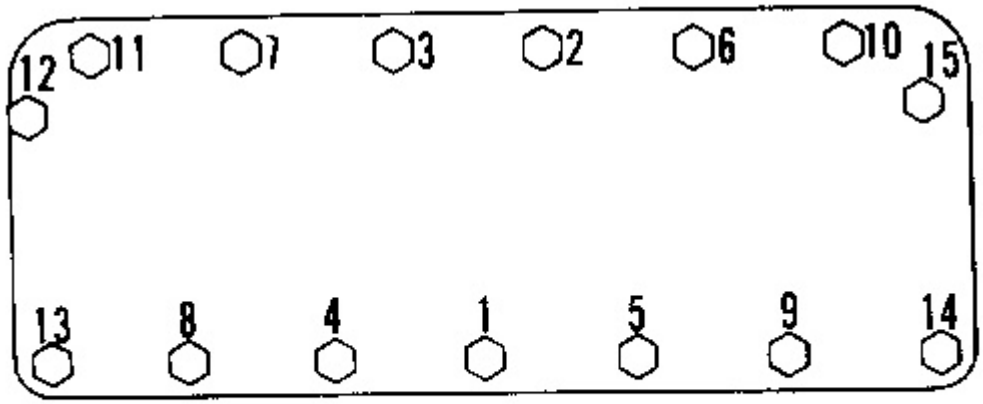
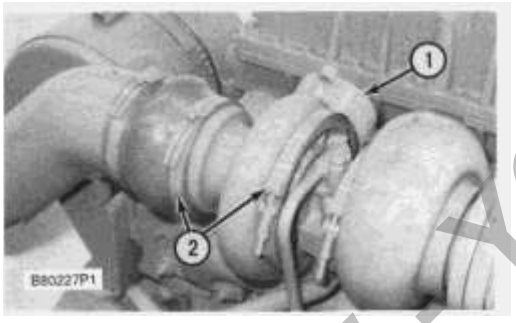
1. Install a new gasket on the valve cover if needed. Put **5H2471 Cement** on the contact surfaces of the valve cover and gasket when a new gasket is installed.

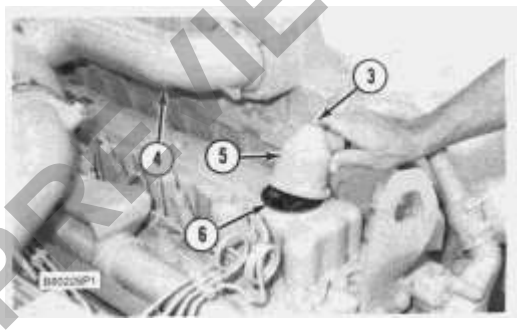


77083P1

2. Put the valve cover in position on the cylinder head. Install the bolts that hold it. Tighten the bolts in the numbered sequence shown to a torque of **11 ± 3 N·m (8 ± 2 lb ft)**.



3. Rotate turbocharger housing (1) to its original position. Tighten clamps (2). Tighten the clamps to a torque of **14 ± 3 N·m (10 ± 2 lb ft)**.



4. Put the gasket and pipe (4) in position. Install the bolts that hold them.

5. Put O-ring seal (6) and breather cap (5) in position. Install bolt (3). Tighten the bolt to a torque of **14 ± 3 N·m (10 ± 2 lb ft)**.

6. Slide the hose into position on the breather cap. Tighten the clamp that holds the hose.

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Illustration 1 g01347082

Typical example

(2) Spring washer

(3) Washer

(1) **4B-4910** Spring

Quantity ... Five
Length under test force ... 69.9 mm (2.75 inch)
Test force ... 65.0 ± 4.5 N (15 ± 1 lb)
Free length after test ... 102 mm (4.0 inch)
Outside diameter ... 24.6 mm (0.97 inch)

(4) Torque for the full nut on the valve adjustment screw ... 29 ± 7 N·m (21 ± 5 lb ft)

(B) Valve lash

Inlet valves ... 0.38 ± 0.08 mm (0.015 ± 0.003 inch)
Exhaust valves ... 0.64 ± 0.08 mm (0.025 ± 0.003 inch)

(C) Bore in the sleeve bearing for the new shaft ... 18.448 ± 0.013 mm (0.7263 ± 0.0005 inch)

Diameter of the new shaft ... 18.402 ± 0.013 mm (0.7245 ± 0.0005 inch)

Maximum permissible clearance between the sleeve bearing and the worn shaft ... 0.20 mm (0.008 inch)

(D) Diameter of the new valve lifter ... 33.288 ± 0.013 mm (1.3105 ± 0.0005 inch)

Bore in the block for the new valve lifter ... 33.388 ± 0.050 mm (1.3145 ± 0.0020 inch)

Maximum permissible clearance between the lifter and the bore for the worn valve lifter ... 0.30 mm (0.012 inch)

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Previous Screen

Product: EXCAVATOR
Model: 330B L EXCAVATOR 6DR
Configuration: 330B L Excavator 6DR00001-UP (MACHINE) POWERED BY 3306 Engine

Systems Operation
308B, 311B, 312B, 315B, 317B, 318B, 320B, 322B, 325B, 330B, M325B and W330B Excavators Engine and Pump Control

Media Number -RENR1998-06 **Publication Date -01/10/2004** **Date Updated -06/10/2004**

i01261589

Work Mode

SMCS - 1931

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Note: If you fail to enter a part quantity, the message in Illustration 12 will appear

12. Enter a part number in the "Part Number" field.
13. Select either the "Solid" or "Fluid" radio button.
14. Enter a description of the part in the "Description" text field.
15. Enter notes in the "Notes" text field.
16. Repeat Steps 9 through 14 until you have added all the desired parts.
17. If you wish to remove a part from the step, select the check box next to the part you wish to delete.
18. Click the blue "Delete Parts" button.
19. Repeat Steps 17 and 18 until you have removed all desired parts.
20. Click the "Save" button. The edited checklist step is saved.

Add New Step to Checklist

In order to add a new step to a checklist, use the following procedure:

1. From the "Edit PM Checklist" screen, click the "Add New Steps" button. Refer to Figure 8. The "Add New Steps" window will be displayed.

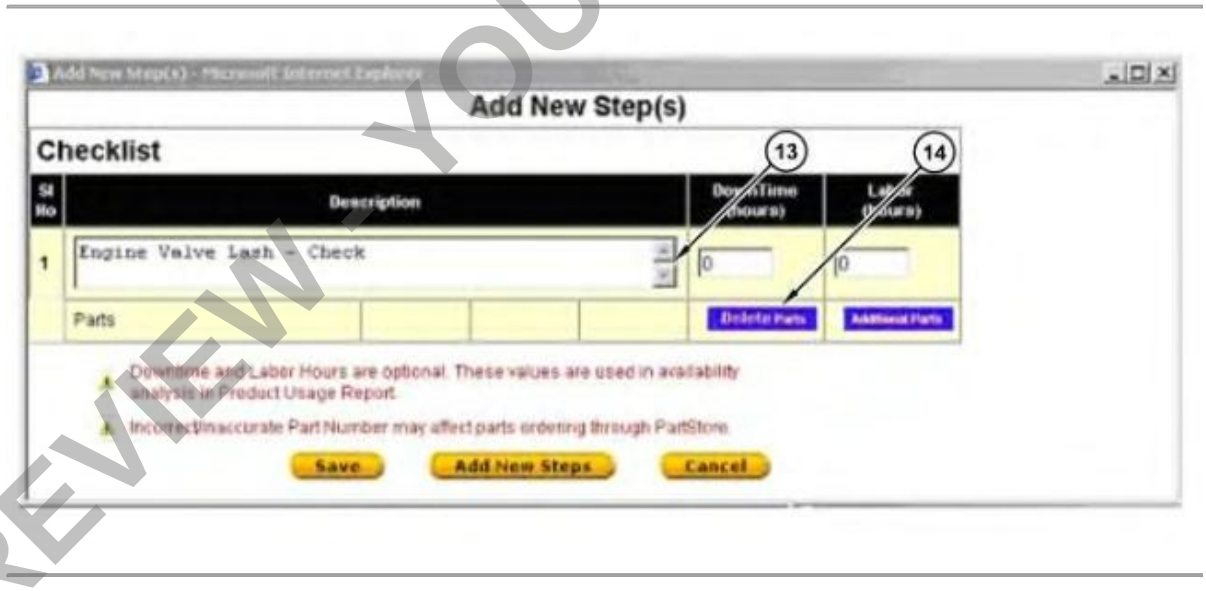

Illustration 13 g01732839

"Add New Step(s)" screen

(13) "Add New Steps" button

(14) "Delete Parts" button

2. Complete the fields on the "Add New Steps" screen. The fields are the same as the fields that are in the "Edit Step" window.
3. If you wish to add more than one step, click the "Add New Steps" button (13) and repeat Step 2.

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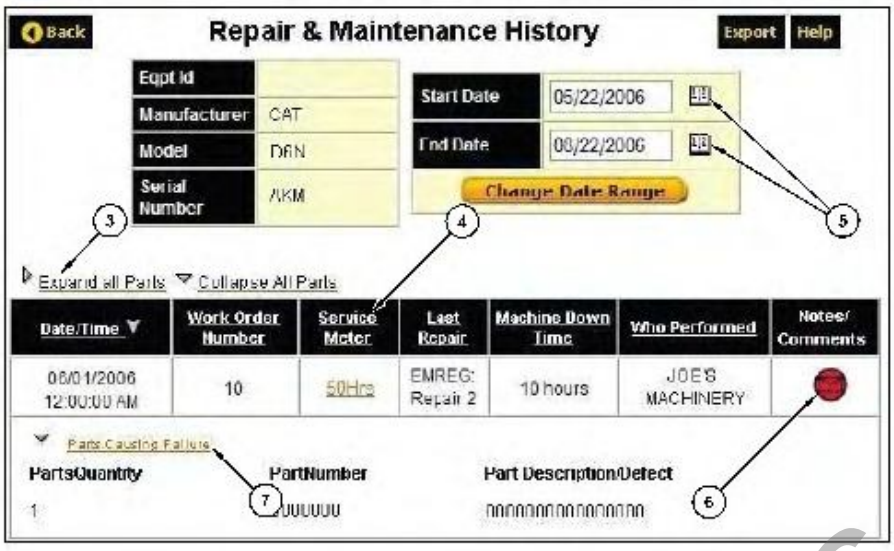

Illustration 2 g01738817

"Repair & Maintenance History" screen

(3) "Expand All Parts" link/icon

(4) "Service Meters" column

(5) Calendar icon

(6) Icon of and envelope

(7) "Parts Causing Failure" link/icon

1. On the "Major Repair" screen, in the "Service Meters" column (4) , click the value in the field. Refer to Illustration 2. The "Repair & Maintenance History" screen will be displayed.
2. Click the calendar icon (5) next to the "Start Date" and "End Date" fields and select a date to indicate a time period for the PM history.
3. In order view the parts causing failure for the major repair, click either the "Expand All Parts" link/icon (3) or the "Parts Causing Failure" link/icon (7) .
4. In order view the comments, click the icon of and envelope (6) in the "Notes/Comments" column.

Request Quote

You can request a quote for the next major repair directly from EquipmentManager. EquipmentManager will send an e-mail to the Dealer Administrator of the Dealer's Web site that you are logged in.

In order request a quote, use the following procedure:

1. From the "Major Repair" screen, select the equipment for which you wish to request a quote.
2. Click the "Request Quote" button. The "Quotation Details" screen will be displayed.

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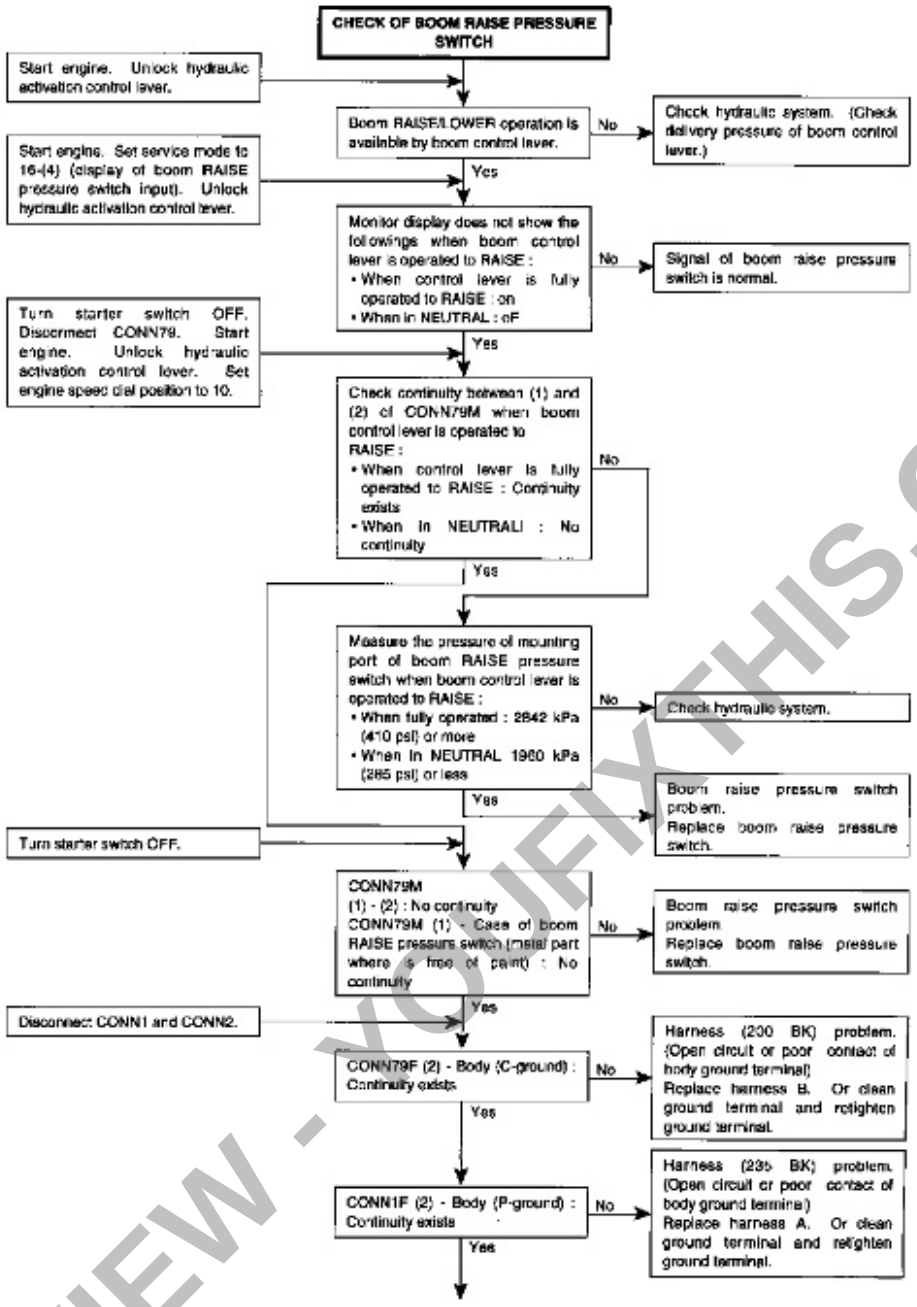

Illustration 2 g00662210

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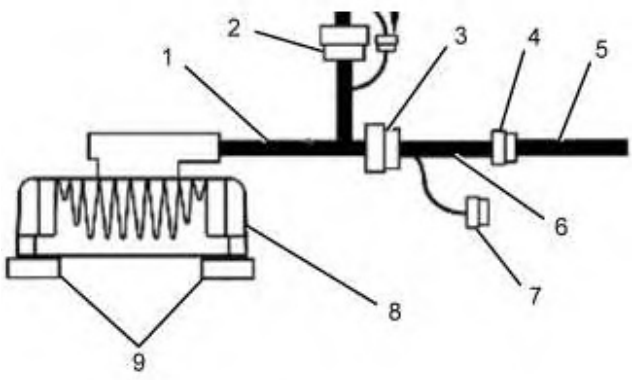

Illustration 2 g02173503

Overview of the connection of the PL522 or 523 field installation group (conversion)

(1) 256-6804 Control Harness As

(2) 12 pin connector

(3) 12 pin receptacle connector

(4) 6 pin Product Link connector

(5) Machine harness

(6) 257-9163 Adapter

(7) Serial service connector

(8) PL522 or 523 ECM

(9) 256-0501 Plate

Legacy Harness for Caterpillar Machines

Table 1

Legacy Harness Connections			
P1 Connector Pin Number	**Harness Wire**	**Description**	**Connection Point for the Machine**
1	125-RD	Batt +	Fused (5 amp) unswitched power circuit (1)
2	200-BK	Batt -	Machine Ground
3	308-YL	Keyswitch On	Circuit that provides battery voltage only when the keyswitch is turned to the ON position
4	403-GN	R-terminal	Alternator R-terminal circuit (2)
5	N957-PK	RS-232 Port 1-TXD	-
7	N960-OR	RS-232 Port 1-RXD	-

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negative lead should be connected to the battery terminal. Use the 10 A connections in order to avoid damage.

Note: The standard acceptable current draw is 50 mA. A current draw above 50 mA usually indicates a problem. However, some large machines with multiple electronic control modules have a higher acceptable limit. For more information, contact a Caterpillar dealer or contact the business unit that produces the machine.

Expected Result:

The current is below .050 amperes (50 mA).

Results:

- **YES -** The current is below 0.050 A. The charging system is currently good. The fault is possibly an intermittent draw in the system. The batteries may be faulty. Check that NO accessories were ON during the test.**STOP**
- **NO -** The current is above 0.050 A. There is excessive current flow in the system. Proceed to test step 13.

Test Step 13. TEST THE CURRENT OF THE ALTERNATOR OUTPUT BELOW 2 AMPERES.

A. Turn the keyswitch to the OFF position.

B. Connect the **9U-5795** Current Probe to a DMM (digital multimeter) or use a **225-8266** Ammeter Tool Gp . Clamp the probe around the "B+" wire of the alternator. Before you clamp the probe around the wire, ensure that the probe is "zeroed".

C. Read the current on the meter. Make a note of the current that was measured.

Expected Result:

The current is under 2 A.

Results:

- **YES -** The current is under 2 A. Proceed to test step14.
- **NO -** The current is over 2 A.

  Repair: There is an internal problem with the alternator. Replace the alternator or proceed to Systems Operation, "Component Description". Use the descriptions of the components in order to determine the component that has failed. Proceed to the appropriate component test.

  STOP

Test Step 14. TEST THE OUTPUT CURRENT OF THE ALTERNATOR BELOW 0.015 AMPERES.

A. Disconnect the wire from the "B+" terminal of the alternator. Set the multimeter on the 10 amp scale. Connect the red lead of the multimeter to the wire that was disconnected. Connect the black lead of the multimeter to the "B+" terminal of the alternator. Make a note of the current that was measured.

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The following disassembly procedure shows the disassembly of the N3 series alternator (35 amperes).

NOTICE

Care must be taken in the following step not to damage the alternator. Do not overtighten the vise.

1. Position the alternator in a vise or a similar clamping device.
2. Remove the following components: the pulley nut, the pulley and the fan.

Illustration 1 g00870070

3. Remove the two screws (1). Then remove the regulator cover.

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38. Use six bolts, washers and nuts in order to hold Tooling (A) together. Tighten the bolts to a torque of 875 ± 100 N·m (645 ± 74 lb ft).

Illustration 16 g00615510

Typical Example

39. Loosen eight bolts (19) until plate (18) can be secured to a floor jack for removal. The weight of cover plate (18) is approximately 75 kg (165 lb).

40. Remove eight bolts (19) and the washers that secure cover plate (18) to the undercarriage.

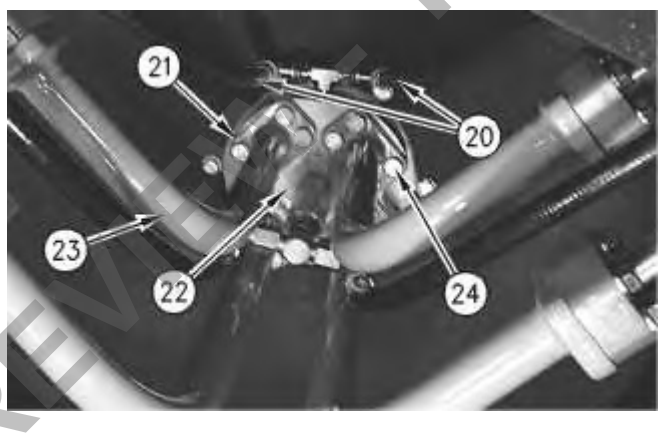

Illustration 17 g00615512

Typical Example

View of the underside of the swivel joint

41. Disconnect hose assemblies (20). Put plugs in the end of the hose assemblies. Plugs prevent oil loss. Plugs prevent contamination of the hydraulic system.

42. For assembly purposes, put identification marks on tube assemblies (23). The assemblies are connected to the bottom of the swivel joint.

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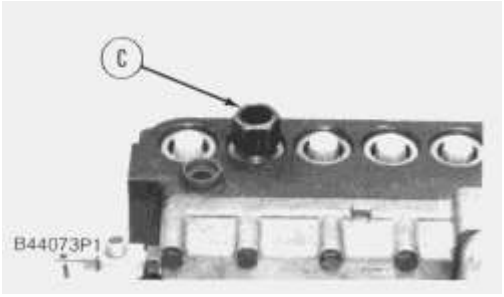
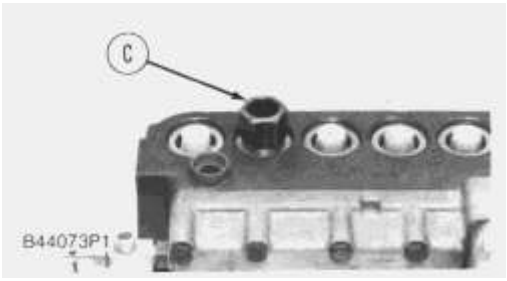


8. Install Tool (C) on the bushing and tighten the bushing to a torque of **190 ± 14 N·m (140 ± 10 lb ft)**.



9. Install Tool (D) to measure total rack travel. Correct rack travel is **15.7 mm (.618 in)**. A smaller measurement is an indication of incorrect fuel injection pump installation.

10. Do Steps 1 through 9 again for installation of the other fuel pumps.

11. Install the cover and gasket on the fuel injection pump housing.

End By:

a. install governor

Disassemble Fuel Injection Pumps

Start By:

a. remove fuel injection pumps

NOTICE

Be careful when the injection pumps are disassembled. Do not damage the surfaces of the plungers, barrels and bonnets. Any scratches will cause leakage inside the fuel injection pump. The plunger and barrel for each pump are made as a set. Do not put the plunger of one pump in the barrel of another pump. If one part has wear, install a complete new pump assembly. Be careful when the plunger is put into the bore of the barrel.

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Product: EXCAVATOR
Model: 330B L EXCAVATOR 6DR
Configuration: 330B L Excavator 6DR00001-UP (MACHINE) POWERED BY 3306 Engine

Disassembly and Assembly
3304B and 3306B Engines for Caterpillar Built Machines
Media Number -SENR5598-09 **Publication Date -01/01/2013** **Date Updated -25/01/2013**

i00906240

Fuel Transfer Pump - Install

SMCS - 1256-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

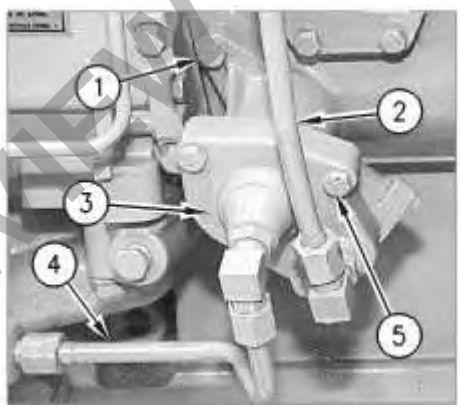

Illustration 1 g00462112

1. Install the O-ring seal and fuel transfer pump (3). Install bolts (1) and (5) .
2. Install tube assembly (2) and tube assembly (4) .
3. Turn the fuel supply line valve to the ON position.

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6. Move only the joysticks or the pedals of the hydraulic circuit that requires service to the FULL STROKE positions. This will release the high pressure only in that hydraulic circuit. This will also release any pressure that might be present in the pilot hydraulic circuit.

   Note: If the hydraulic circuit that requires service requires the activation of a switch for operation, activate the necessary switches for the operation of the hydraulic circuit.

7. Place the hydraulic activation control lever in the LOCKED position.

8. Start the engine.

9. Place the hydraulic activation control lever in the UNLOCKED position. **Do not move any joysticks or pedals from the NEUTRAL position during this step. Do not activate any switches during this Step.**

10. Return the hydraulic activation control lever to the LOCKED position.

11. Shut off the engine.

12. Repeat Steps 4 through 11 for each additional hydraulic circuit that requires service.

13. After releasing the hydraulic pressure in each of the desired hydraulic circuits, place the hydraulic activation control lever in the LOCKED position.

14. Turn the engine start switch to the OFF position.

15. Slowly loosen the filler plug on the hydraulic tank and release the pressure. Leave the filler plug loose for a minimum of 45 seconds. This will release the pressure that may be present in the return hydraulic circuit.

16. Tighten the filler plug on the hydraulic tank to the specified torque.

17. The pressure in the multiple hydraulic circuits that require service is now released and lines and components can be disconnected or removed from those hydraulic circuits.

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(1) Refer to Tool Guide, NEHC2004, "Hydraulic Cylinder Repair Stands".

Note: Cleanliness is an important factor. Before the assembly, all parts should be thoroughly cleaned in cleaning fluid. Allow the parts to air dry. Wiping cloths or rags should not be used to dry parts. Lint may be deposited on the parts which may cause later trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement.

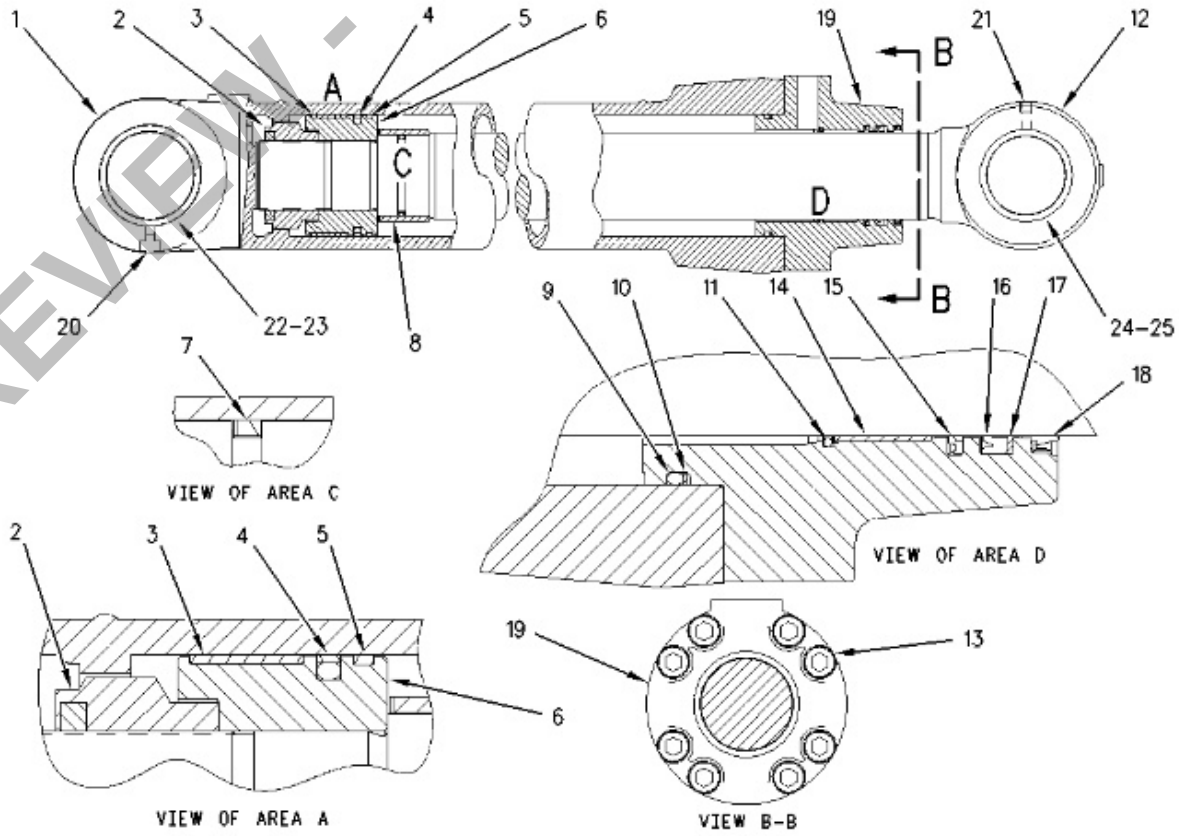
NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Put identification marks on all lines, on all hoses, on all wires, and on all tubes for installation purposes. Plug all lines, hoses, and tubes. This helps to prevent fluid loss and this helps to keep contaminants from entering the system.



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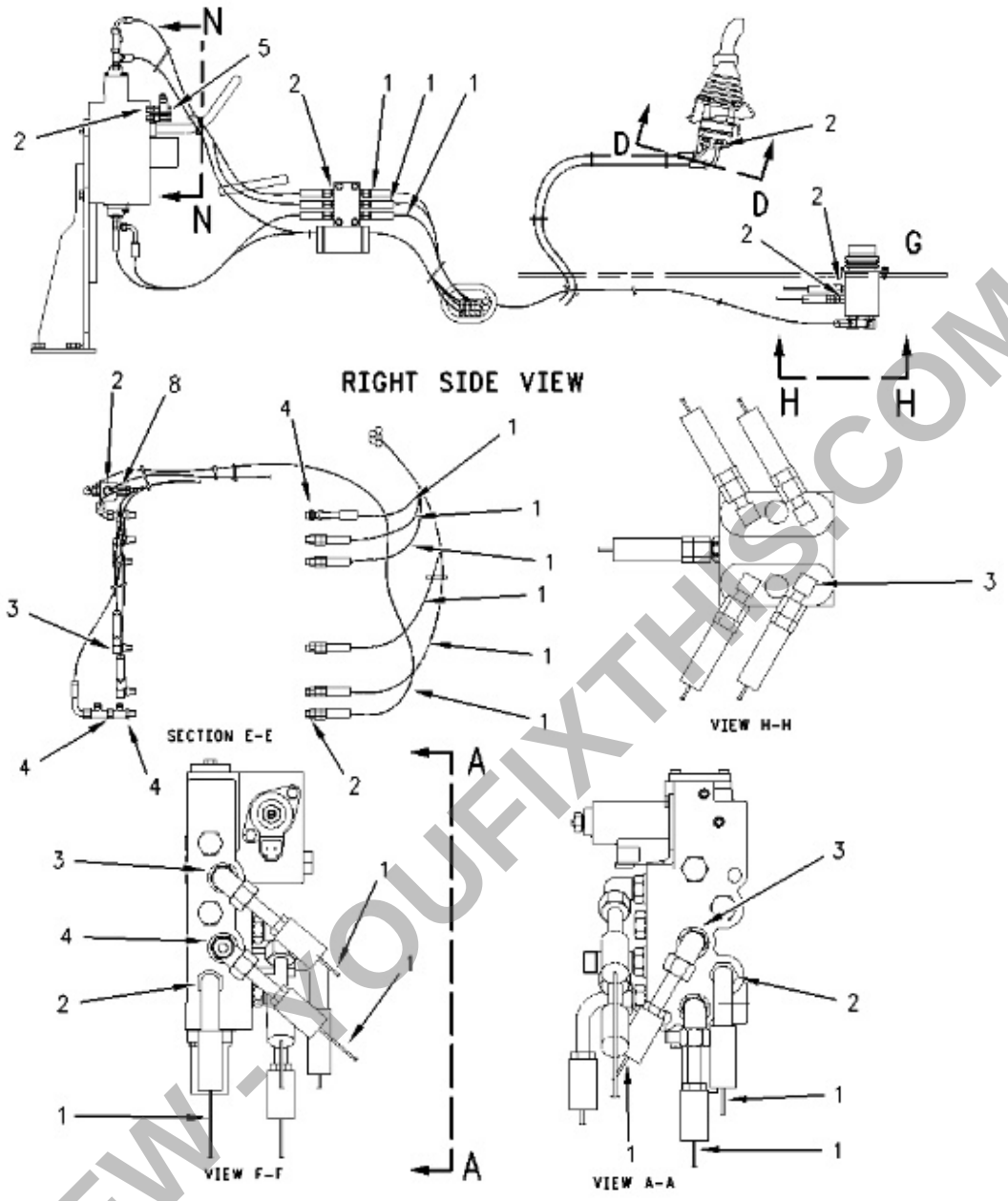

Illustration 2 g00532842

(1) Torque for 30 hose assemblies ... 40 ± 5 N·m (30 ± 4 lb ft)

(2) Torque for 29 connectors ... 40 ± 5 N·m (30 ± 4 lb ft)

(3) Torque for 11 elbows ... 40 ± 5 N·m (30 ± 4 lb ft)

(4) Torque for five tees ... 40 ± 5 N·m (30 ± 4 lb ft)

(5) Torque for two plugs ... 40 ± 5 N·m (30 ± 4 lb ft)

(6) Torque for three switch assemblies ... 29 ± 2 N·m (15 ± 1 lb ft)

(7) Torque for fitting ... 40 ± 5 N·m (30 ± 4 lb ft)

(8) Torque for stopper ... 40 ± 5 N·m (30 ± 4 lb ft)

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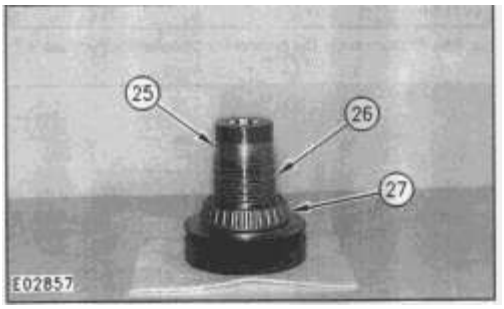


NOTICE

Care must be used when removing the glide rings. Damage to the sealing surfaces can occur. This will result in leakage within the grapple swivel assembly.

24. Carefully remove the four glide rings and O-rings (26) from swivel shaft (25). In order to remove the glide rings a screwdriver or other removal tool can be used to sever (cut) the glide ring.

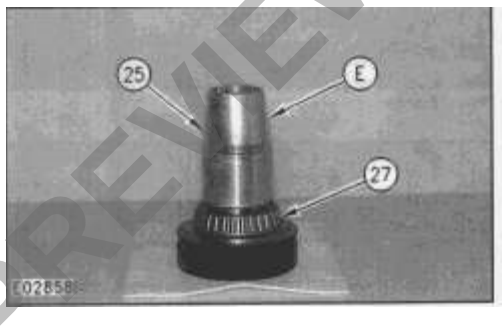
NOTE: Removal of the bearing will damage the bearing. Install a new bearing during assembly.

25. Remove bearing (27) from swivel shaft (25).

NOTE: The following steps are for the assembly of the grapple swivel and the motor assembly.

26. Prior to assembly make sure all components of the grapple swivel assembly and the grapple swivel motor assembly are free of dirt and debris.

27. Check the condition of all the components used, for wear or damage. Use new parts for replacements.



28. Heat new bearing (27) to a temperature 60 °C (140 °F). Install bearing (27) on swivel shaft (25). Check bearing (27) to insure that it is seated.

29. Install O-rings (26) on swivel shaft (25).

30. Use Tooling (E) to expand the four glide rings.

31. Lubricate the glide rings. Install the glide rings on swivel shaft (25).

32. Use Tooling (E) to compress the glide rings.

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3. Open the auxiliary hydraulic shutoff valve in order to relieve the pressure in hydraulic line (2) .

   Note: Oil will drain from the hydraulic line when the line is disconnected from the auxiliary hydraulic shutoff valve. Place a suitable drip pan under the auxiliary hydraulic shutoff valve in order to collect the oil.

4. Disconnect hydraulic line (2) from auxiliary hydraulic shutoff valve (1) .

5. Remove two bolts (3). Remove the shutoff valve (1) .

6. Repeat 3 through 5 in order to remove the other shutoff valve.

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Note: Assemble this linkage on the machine by rotating the rod end of the bucket cylinder and by positioning the grease fitting away from the stick. Coat all of the bores for pins with lubricant.

(1) **7Y-2348** Pin

Diameter after plating ... 79.85 ± 0.04 mm (3.144 ± .002 inch)
Minimum thickness for plating ... 0.013 mm (.0005 inch)

(2) **7Y-3552** Bearing

Outside diameter ... 95.180 ± 0.013 mm (3.7472 ± .0005 inch)
Inside diameter ... 80.25 ± 0.02 mm (3.159 ± .001 inch)
Install the bearing in the bearing bore. ... 7.0 ± 0.3 mm (.28 ± .01 inch)

(3) Lubricate the sealing lip slightly with the lubricant that is being sealed.

(4) **118-5196** Pin

Diameter after plating ... 79.85 ± 0.04 mm (3.144 ± .002 inch)
Minimum thickness for plating ... 0.013 mm (.0005 inch)

(5) **7Y-3428** Bearing

Outside diameter ... 95.180 ± 0.013 mm (3.7472 ± .0005 inch)
Inside diameter ... 80.25 ± 0.02 mm (3.159 ± .001 inch)

Install the bearing in the bearing bore. ... 5.0 ± 0.3 mm (.20 ± .01 inch)

(6) Position the four nuts past the end of the four bolts. ... 0.5 mm (.02 inch)

(7) Torque for four nuts (7) against four nuts (6) ... 200 ± 40 N·m (150 ± 30 lb ft)

(8) **118-5196** Pin

Diameter after plating ... 79.85 ± 0.04 mm (3.144 ± .002 inch)
Minimum thickness for plating ... 0.013 mm (.0005 inch)

(9) **7Y-2349** Pin

Diameter after plating ... 69.85 ± 0.04 mm (2.750 ± .002 inch)
Minimum thickness for plating ... 0.013 mm (.0005 inch)

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Suction lowers the refrigerant pressure in the evaporator. Metered restriction, which is provided by the orifice tube, allows the high pressure liquid to be reduced to a low pressure vapor. This helps with the evaporation of refrigerant, which leads to continuous cooling.

Pumping

Pumping circulates the refrigerant in the air conditioning system. This also leads to continuous cooling.

Compression (Discharge Side)

Compressing the refrigerant changes the refrigerant from a gas to a liquid. The condenser assists in this process. When pressure increases, the temperature of saturation increases. Compressor (1) changes the refrigerant from a low pressure to a high pressure. This change must occur so that the refrigerant releases the latent heat of condensation in the condenser.

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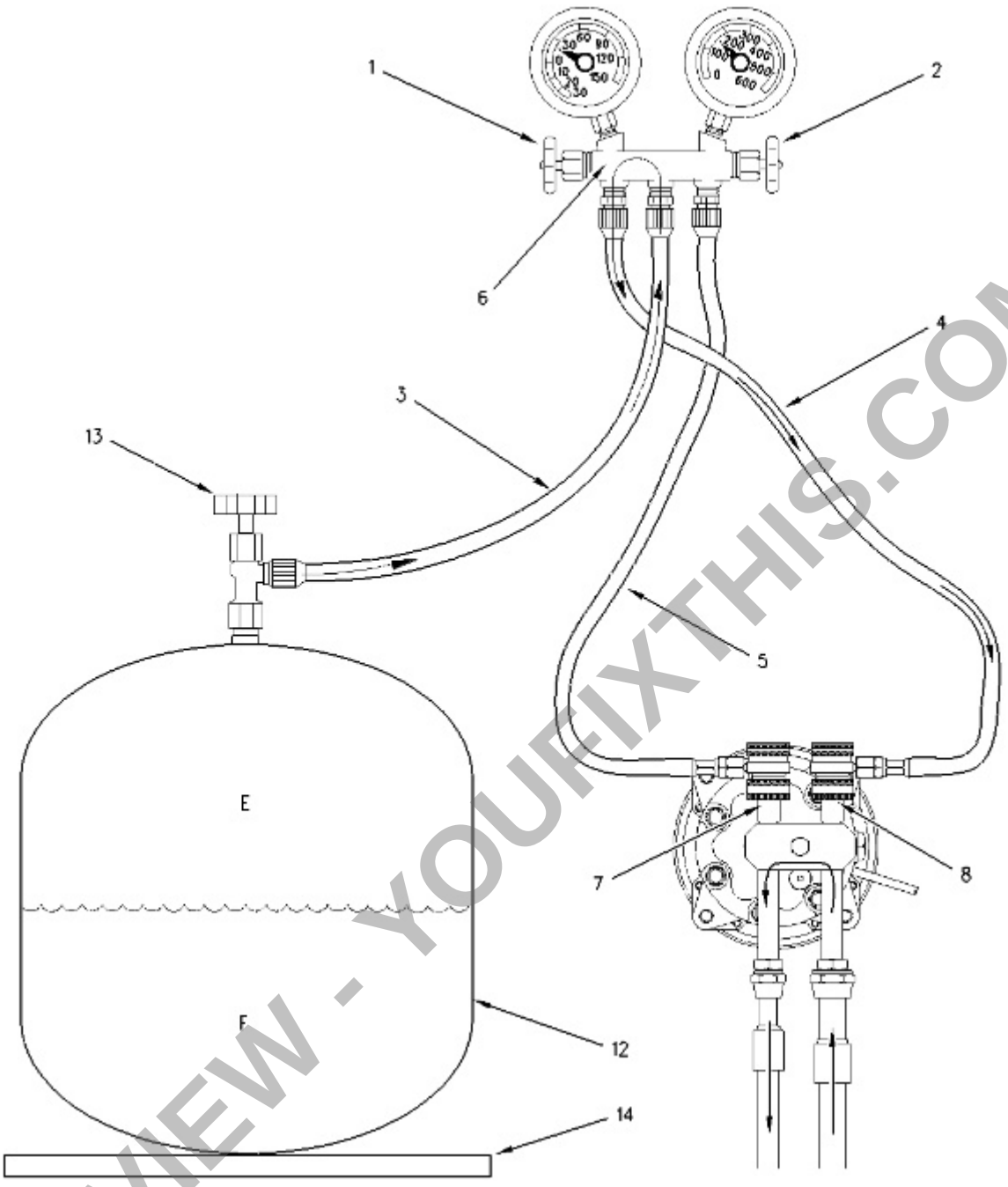

Illustration 1 g00436488

(1) Low pressure valve

(2) High pressure valve

(3) Yellow charging hose

(4) Blue low pressure hose

(5) Red high pressure hose

(6) Manifold gauge set

(7) Service valve (discharge)

(8) Service valve (suction)

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WARNING

Personal injury can result from hot coolant. Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

In order to conduct a performance of the heating system, perform the following procedure.

1. Run the engine at 1000 rpm (low idle speed) until the engine coolant temperature is in the normal operating range.
2. Adjust the temperature control knob to the hottest position.
3. Put the fan switch in the HIGH position on heat.
4. Check the system for normal operating conditions.
    - The temperature of the air that is flowing from the louvers (air ducts) should be warm.
    - The temperature of the air should be easily controllable by the control panel in the dash.
    - There should not be a smell of coolant that is present in the cab.

If any of the three items are not working properly, refer to Service Manual, SENR5664, "Heating System Troubleshooting".

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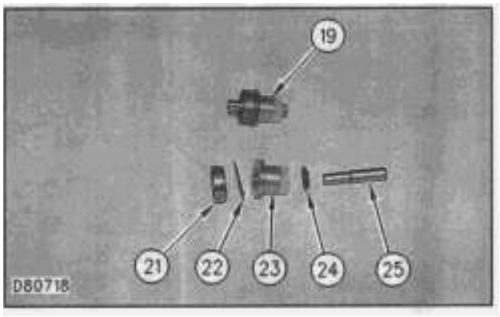
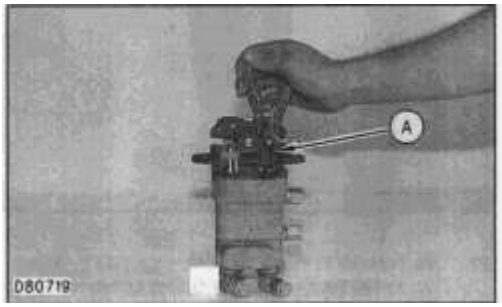
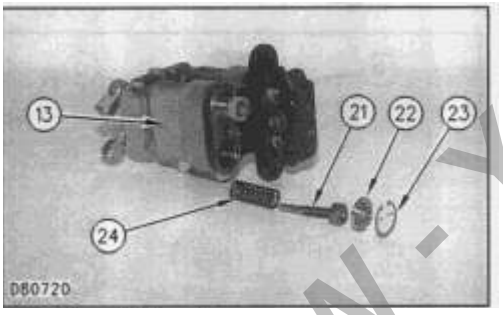


12. Disassemble plug assembly (19) as follows:

a. Remove piston (21) from push rod (25). Remove push rod (25) from plug (23).

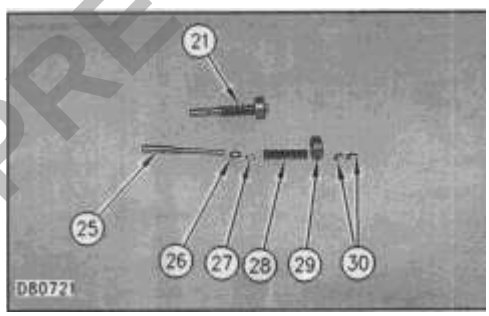
b. Remove O-ring seal (22) and packing (24) from plug (23).





13. Use Tool (A) to remove retaining ring (23) from housing (13). Remove bushing (22), spool assembly (21) and spring (24) from housing (13).

14. Disassemble spool assembly (21) as follows:



a. Hold spool assembly (21) in one hand. Compress seat (29) to remove two locking collars (30).

b. Remove seat (29), spring (28), washer (27) and seat (26) from spool (25).

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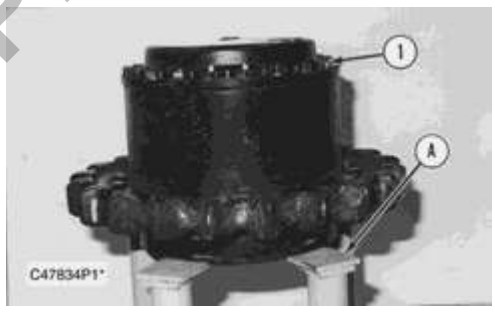
Tools Needed		A	B	C	D	E	F	G
1P-2420	Transmission Repair Stand	1						
138-7573	Link Bracket		2					
1P-1860	Pliers			1				
1P-5546	Cross Block				1		1	
6V-3142	Puller Plate				1			
5P-8248	Washer				4			
	Threaded Rod 3/4" - 16 NF x 280 mm (11 in)				1			
	Spacer 64 mm (2.5 in) O.D. 25.4 mm (1 in) I.D. 64 mm (.25 in) Thick				4			
6B-6682	Nut				1			
138-7574	Link Bracket					2		
1H-3112	Puller Assembly						1	
1P-5551	Screw						1	
5F-7465	Puller Assembly						1	
8B-7561	Plate						1	
1H-3107	Push Puller						1	
8T-9206	Seal Installer							1

Start By:

a. remove final drives

1. Thoroughly clean the outside of the final drive prior to disassembly.

2. Put an alignment mark across the sections of the final drive for assembly purposes. The parts must be reinstalled in their original locations.



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19.05 mm (0.750 inch)		100 ± 15 N·m (74 ± 11 lb ft)
22.22 mm (0.875 inch)	1 1/4	110 ± 17 N·m (81 ± 13 lb ft)

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